J Ped Surg Case Reports 11 (2016) 35–38

Contents lists available at ScienceDirect

Journal of Pediatric Surgery CASE REPORTS

journal homepage: www.jpscasereports.com

Free anterolateral thigh perforator flap for sacroiliac defect: First case report in pediatric population

Alejandro E. Ramirez [a,*], Carolina A. Soto [b], Francisco J. Nuñez [c], Cecilia A. Briones [a], David A. Ferj [a], Carmen G. Morovic [a]

[a] Dr. Luis Calvo Mackenna Hospital, Santiago, Chile
[b] Pontificia Universidad Católica de Chile, Santiago, Chile
[c] Universidad de Chile, Santiago, Chile

ARTICLE INFO

Article history:
Received 23 February 2016
Received in revised form
2 June 2016
Accepted 3 June 2016

Key words:
Free flap
Sacroiliac
Pediatric

ABSTRACT

Soft tissue defects of the sacroiliac area, usually can be covered by local flaps. However, for more complex defects, free flap transfers became necessary. We report a case of reconstruction with a free anterolateral thigh (ALT) perforator flap for coverage of a sacroiliac bone exposure in a child. A six-years-old boy, suffered a car accident, resulting in pelvic and sacral fractures, as well as degloving injuries of the left thigh, buttocks, and trunk. The patient evolved with an unstable scar over the sacroiliac region with bone exposure. ALT free flap was performed. Left superior gluteal vessels were used as the recipient vessels. A stable coverage was achieved without complications. This is the first case reported of a free ALT perforator flap for sacroiliac coverage in the pediatric population. In cases of complex reconstruction in children, free perforator flap is a safe choice and should be considered in the algorithm of treatment.

Soft tissue defects in the trunk and buttocks are usually covered with local or regional flaps [1]. In extensive sacrolumbar defects with complex wound or unstable scar, reconstruction with free tissue transfer must be considered as a good one-stage reconstruction option. There are few reports of free tissue transfers to sacrolumbar region in adults, however successful outcomes have been communicated either with muscle, myocutaneous or perforator free flaps [2].

In the pediatric population, reconstructive microsurgery has gained widespread acceptance after an initial period of concern regarding the technical feasibility and reliability of the procedure. In the same way, perforator free flaps have been shown to be a valuable alternative in children [3].

We present the first case report of a perforator anterolateral thigh free flap to a complex sacroiliac soft tissue defect with bone exposure in a six-year old boy.

1. Case report

A six-year old boy, suffered a motor vehicle accident. At the first trauma evaluation, he was diagnosed with a left femur fracture, unstable pelvis fracture (pubic bone, sacrum, ilium luxofractures), traumatic degloving of the left thigh and buttocks with roughly 80% gluteus maximus lost, parcial avulsion of sacral nerves at left side, and lumbar and left posterior thoracic region degloving as well. Besides gluteal defect, there was no motor injury to the left lower extremity. Fractures were fixed and pelvis stabilized. After the extensive buttocks soft tissue lost, patient evolved with free-standing anus that required descendant loop colostomy.

Four days after, he was referred to our unit to treat the large soft tissue defect (Fig. 1, upper).

After several debridements and negative pressure wound therapy, it was possible to perform temporary coverage with local advancement flaps and split thickness skin grafts. Amputation was not an option at any time. After recovery from the trauma, the patient evolved with an unstable scar over the iliac crest and sacrum (Fig. 1, down). There was no healthy tissue available for local or regional flaps. Considering the low morbidity at the donor site

* Corresponding author. Vitacura avenue 5093, Office 304, Vitacura, Santiago 7360000, Chile.
E-mail address: aramirez@dralejandroramirez.cl (A.E. Ramirez).

http://dx.doi.org/10.1016/j.epsc.2016.06.001

Fig. 1. A six-year-old boy sustained an extensive traumatic degloving injury of left thigh, buttocks and trunk in a motor vehicle accident.

Fig. 2. Preoperative view. Sacroiliac region with unstable hypertrophic split graft scar and bone exposure, an anatomic unit of 18 × 7 cm was needed to replace. Marking of anatomic landmarks in left gluteal zone to explore recipient vessels (upper) and right thigh donor site for anterolateral thigh perforator free flap (down).

and the good pedicle of the flap we decided to perform a free anterolateral thing perforator flap.

Preoperative pelvis computed tomography angiography described good patency of the left superior gluteal vessels (SGA) next to the sacrum.

The right thigh donor site, was explored in the established fashion with hand-held sound doppler to identify perforator vessels.

The reconstruction began with the patient initially placed in the prone position. To achieve a good coverage of the defect, the total dimension of the area to be replaced was 18 × 7 cm. We marked known anatomic landmarks of superior and inferior gluteal arteries perforators emergences and the incision of the lateral limit of the anatomic unit that will be replaced (Fig. 2, upper). Hand-held sound doppler was used to confirm the presence of suitable recipient vessels at the defect site.

In a muscle-splitting approach, we performed the dissection of the remaining gluteus maximus muscle until we found suitable recipient vessels for microvascular anastomosis (Fig. 3). After recipient vessels preparation, the ALT flap was elevated in the supine position.

Markings had been made preoperatively for a right-sided ALT flap (Fig. 2, down).

ALT flap was harvested and primary closure of donor site was done.

The patient was repositioned back into the prone position and after partial inset, the microvascular anastomosis using the continuous suture and interrupted tie technique with 9–0 nylon was performed. The SGAP vessels where used as the recipient vessels. The ALT pedicle artery diameter was 1.5 mm, slightly larger than the SGAP artery. Two veins and one artery where anastomosed. Final flap inset was performed with 2–0 PDS, 3–0 vicryl and 3–0 nylon. One 15-French Blake drain was placed subcutaneously (Fig. 4).

After surgery the patient was maintained in prone position for three weeks. Drains were removed one week after surgery with a fluid debit less that 10 cc a day.

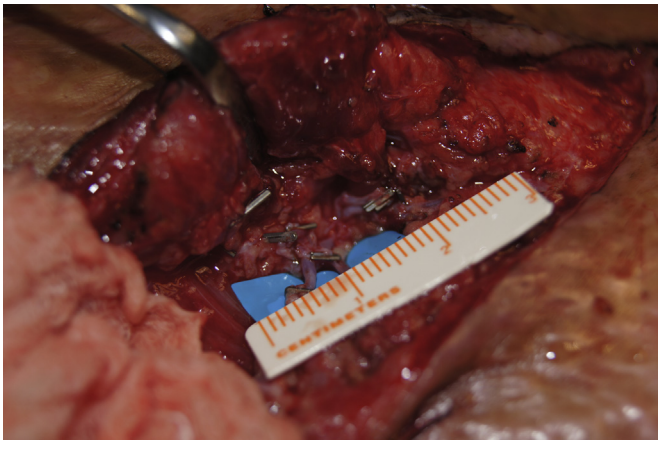

Fig. 3. Intraoperative close-up of recipient vessels (intramuscular branches of SGA) after muscle-splitting approach.

Fig. 4. Post operative view of flap inset.

We only use low molecular weight heparin for deep vein thrombosis prophylaxis as post operative flap protocol. We do not use aspirin.

There have been no flap or donor site complications at 12 months follow-up (Fig. 5). Good and stable coverage of the sacroiliac zone was achieved in a one-stage surgery, allowing continuing for continuation of the rehabilitation program. The patients returned to walk at nine months, and one-year after the accident was able to resume school.

2. Discussion

There are several options traditionally used for reconstruction of the lumbosacral region which include, local tissue flaps from the buttocks, regional pedicled flaps from the thighs, and more recently the reported perforator-preserving gluteal artery based rotation fasciocutaneous flaps [1]. However, for some complex defects, such as cases of multiply recurrent pressure ulcers, extensive traumatic soft tissue defects or compromised adjacent tissue, a free flap transfer either as muscle, myocutaneous or fasciocutaneous perforator free flap is an option with high success rates [2,4].

Fig. 5. Six months after free tissue transfer. It was achieved a stable coverage in sacroiliac region.

In 1975, a few years after performing the first case in adults, Harii reported the first free flap in children [5]. In the pediatric population, microsurgery surgery has gained widespread acceptance after an initial period of concern regarding the technical feasibility and reliability of the procedure. The success rate of free flaps reported in the literature in pediatric series range from 90% to 96% [6,7].

The use of perforator free flaps in children, also suffered an initial suspicion regarding the size of the pedicle vessels and survival of the flap in children. However, interesting studies have described that the perforator vessels, although smaller in children than in adults, have a relative size when compared with the size of the child's body which is greater than that in adults [3], ensuring a good perfusion of the skin paddle.

The aim of this report was to present a challenging sacroiliac soft tissue defect reconstruction in a child, who initially presented with an extensive degloving injury of the left thigh, buttocks and trunk.

After a thorough analysis of the local conditions of the patient and potential reconstructive options, it was decided to perform a free ALT, being the first reported case of its kind in the pediatric population.

During the first reports of free tissue transfer to lumbosacral region, there was concern about the suitability of local recipes vessels to perform a microanastomosis. However, there are some reports of the use of gluteal superior or inferior vessels, femoral vessels and posterior intercostals vessels as recipients vessels with successful outcomes [3,4,8,9].

Preoperative study of the recipient site, was assessed with a pelvic angio CT.

During surgery, the anatomic landmarks for emergencies of SGA and IGA perforators were marked. Hand-held sound doppler was used to corroborate vascular doppler signals from the traumatic amputees intramuscular branches of the SGA. With this information, we performed the dissection of remnant left gluteus maximus in a muscle-splitting approach, and suitable vessels were exposed.

This approach results in less gluteal muscle damage, which is important in patients who are able to walk.

Although the preoperative CT helps with the identification of potential recipients vessels, in our experience with complex cases, the careful dissection of the area with potential recipient vessels is the most important step to finally decide if a free flap can be done.

Another concern in the pediatric patients is the selection of the donor site. The two major criticisms of free flaps are the deficit at the donor site and possible effects on normal growth. Chiang et al. [10] found no growth disturbances at the donor or injury site over a longer follow-up period [11].

The reasoning behind the choice of using ALT free flap considered, the size of the defect, the potential donor areas and morbidity associated with these, and the intention to not delay the rehabilitation of the child. The literature supports our flap election since, perforator flaps have been shown to be safe in children [3–13] and provide a minimal donor site morbidity.

In our experience, ALT flap design and elevation in children, follows similar principles to the adult patient. One of the differences is the estimation for primary closure of the donor site. Although in adults, an 8 cm flap width most of the time allows primary closure of the thigh, in pediatric patient this is relative. The younger the patient, the more important the pinch test of the thigh to estimate the maximum width of the flap.

Maximum length of the flap depends on the size and number of perforators than can be included in the flap. Since we usually use an elliptical flap design, the flap length is not restricted. This makes easier to manage the dog ear at the ends of the incision. If any tip of the flap is clinically congested after 5 min of observation, that part of the flap is discarded. Dissection of the perforator is usually made using 2.5× loupes. However, if during dissection the perforator is considered to small, we do not hesitate in performing the perforator dissection under microscope.

Vascularity of the flap after autonomization was evaluated with clinical assessment of capillary refill and the red bleeding at the edges of the flap. These are reliable signs for safe flap elevation and estimation of the final flap size.

In this case, the ALT flap elevated, was the largest possible size for primary closure of the donor site. This size was estimated by pinch test of the thigh at different levels. The main concern of this reconstruction was to achieve and stable coverage of the pressure bearing areas of the sacrum, and this was nicely achieved with the designed flap.

The versatility of the ALT flap is well known, and this case illustrates its use as a safe option in the sacroiliac area.

3. Conclusion

This is the first case reported in the literature of a free ALT perforator flap for sacroiliac coverage in the pediatric population. Free perforator flaps should be considered in the treatment of children as a safe one-stage reconstruction of complex defects.

Conflicts of interest

The authors report no conflicts of interest.

References

[1] Rubayi S, Chandrasekhar BS. Trunk, abdomen, and pressure sore reconstruction. Plast Reconstr Surg 2011 Sep;128(3):201e–15e.
[2] Park S. Muscle-splitting approach to superior and inferior gluteal vessels: versatile source of recipient vessels for free-tissue transfer to sacral, gluteal, and ischial regions. Plast Reconstr Surg 2000;106:81–6.
[3] Van Landuyt K, Hamdi M, Blondeel P, Tonnard P, Verpaele A, Monstrey S. Free perforator flaps in children. Plast Reconstr Surg 2005;116:159–69.
[4] Mureau MA, Hofer SO. Perforator-to-perforator musculocutaneous anterolateral thigh flap for reconstruction of a lumbosacral defect using the lumbar artery perforator as recipient vessel. J Reconstr Microsurg 2008 May;24(4):295–9.
[5] Harii K, Ohmori K. Free groin flaps in children. Plast Reconstr Surg 1975;55:588–92.
[6] Akçal A, Karşıdağ S, Sucu DÖ, Turgut G, Uğurlu K. Microsurgical reconstruction in pediatric patients: a series of 30 patients. Ulus Travma Acil Cerrahi Derg 2013 Sep;19(5):411–6.
[7] Yildirim S, Calikapan GT, Akoz T. Reconstructive microsurgery in pediatric population—a series of 25 patients. Microsurgery 2008;28(2):99–107.
[8] Park S, Koh K. Superior gluteal vessel as recipient for free flap reconstruction of lumbosacral defect. Plast Reconstr Surg 1998;101:1842–9.
[9] Hung S-J, Chen H-C, Wei F-C. Free flaps for reconstruction of the lower back and sacral area. Microsurgery 2000;2:72–6.
[10] Chiang YC, Jeng SF, Yeh MC, Liu YT, Chen HT, Wei FC. Free tissue transfer for leg reconstruction in children. Br J Plast Surg 1997;50:335–42.
[11] Yu ZJ. The use of bilateral latissimus dorsi myocutaneous flaps to cover large soft tissue defects in the lower limbs of children. J Reconstr Microsurg 1988;4:83–8.
[12] Acar MA, Güleç A, Aydin BK, Erkoçak ÖF, Yilmaz G, Şenaran H. Reconstruction of foot and ankle defects with a free anterolateral thigh flap in pediatric patients. J Reconstr Microsurg 2015 Mar;31(3):225–32.
[13] Gharb BB, Salgado CJ, Moran SL, Rampazzo A, Mardini S, Gosain AK, et al. Free anterolateral thigh flap in pediatric patients. Ann Plast Surg 2011 Feb;66(2):143–7.